MARKED-UP COPY OF SPECIFICATION AND ABSTRACT SHOWING CHANGES MADE THERETO

Patent-Treuhand-Gesellschaft
für elektrische Glühlampen mbH., Munich

Highly efficient fluorescent material

[Technical field] FIELD OF THE INVENTION

The invention proceeds from a fluorescent material from the class of the silicide nitrides in accordance with the preamble of claim 1. In particular these are silicide nitrides which fluoresce in the yellow region.

[Prior art] BACKGROUND OF THE INVENTION

Fluorescent materials of the silicide nitride type such as $Sr_2Si_5N_8$ and $Ba_2Si_5N_8$, already known from the article by Schlieper, Millus and Schlick: Nitridosilicate II, Hochtemperatursynthesen and Kristallstrukturen von $Sr_2Si_5N_8$ und $Ba_2Si_5N_8$ [Silicide nitrides II, high-temperature syntheses and crystal structures of $Sr_2Si_5N_8$ and $Ba_2Si_5N_8$], Z. anorg. allg. Chem. 621, (1995), page 1380. However, in this case no activators are specified which would suggest efficient emission in specific regions of the visible spectrum.

Summary of the invention

[It is an object of the present invention to provide a fluorescent material in accordance with the preamble of claim 1, the efficiency of which is as high as possible, and which can be effectively stimulated by UV and blue radiation in the region of 370 to 430 nm.] having a cation and the basic formula $A_xSi_yN_z$

[This object is achieved by the characterizing features of claim 1. Particularly advantageous refinements are to be found in the dependent claims.]

There is as yet no yellow-emitting fluorescent material of high efficiency which can be effectively stimulated

And other objects are attained in accordance with one aspect of the invention directed to a highly efficient fluorescent material from the class of the silicide nitrides having a cation and the basic formula $A_xSi_yN_z$, characterized in that Sr is used as cation, the silicide nitride being doped with trivalent Ce which acts as activator

per se; for example, $BaMgAl_{10}O_{17}Eu^{2+}$ (known as BAM) or $Ba_5SiO_4(Cl,Br)_6Eu^{2+}$ or $CaLA_2S_4Ce^{3+}$ or else $(Sr,Ba,Ca)_5(PO_4)_3Cl:Eu^{2+}$ (known as SCAP). A red fluorescent material can be used, in addition, in order to improve the color of this system. $(Y,La,Gd,Lu)_2O_2S:Eu^{3+}$, $SrS:Eu^{2+}$ or else $Sr_2Si_5N_8:Eu^{2+}$ (not yet published, see EP-A 99 123 747.0) are particularly suitable.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures

The aim below is to explain the invention in more detail with the aid of two exemplary embodiments. In the drawing:

Figure 1 shows an emission spectrum of a first silicide nitride;

Figure 2 shows the reflection spectrum of this silicide nitride;

Figure 3 shows an emission spectrum of a second silicide nitride;

Figure 4 shows the reflection spectrum of this silicide nitride;

Figure 5 shows a semiconductor component which serves as light source for white light; and

Figure 6 shows an emission spectrum of a mixture of three fluorescent materials.

DETAILED DESCRIPTION OF THE

A concrete example of the fluorescent material according to the invention is shown in Figure 1, which concerns the emission of the fluorescent material, $Sr_2Si_5N_8:Ce^{3+}$, the Ce proportion amounting to 4 mol% of the lattice sites occupied by Sr. The emission maximum is at 545 nm, and the mean wavelength at 570 nm. The color locus is x=0.395;y=0.514. The stimulation is performed at 400 nm.

The production is performed in the usual way, the

ABSTRACT OF THE DISCLOSURE

[Abstract] 1

[Highly efficient fluorescent material]

Fluorescent material from the class of the silicide nitrides, Sr being used as cation, and the silicide nitrides being doped with trivalent Ce.

[Figure 1]